



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

Joleaud, L. LES MIGRATIONS DES MAMMIFÈRES AMÉRICAINS ET AFRICAINS A TRAVERS LES RÉGIONS ATLANTIQUES PENDANT LES TEMPS NÉOGÈNES. Revue générale des Sciences, Paris, vol. 30, pp. 704-713, figs. (maps) 1-9, December 30, 1919.

Professor Joleaud is convinced that free interchange of mammalian life between North America, Africa and Europe took place during the Tertiary period by way of land masses occupying much of the area of the present Atlantic Ocean and persisting intermittently as late as the beginning of the Pliocene. He presents the reasons for this belief in a paper accompanied by nine maps showing the exact transatlantic courses pursued by the following mammals: (1) the *zalambdodont* *Insectivora* (from western North America to the West Indies, western Africa, and Madagascar, with a side branch to southern South America), (2) the *Kalobatippus-Anchitherium* group of horses (from Oregon to Spain and China); (3) the archaic mastodons (from the Mediterranean region to Florida), (4) the *Hipparion* group of horses (from Florida westward across North America and eastward to Europe, northern Africa, China), (5) the Old World porcupines (from South America by way of the West Indies to Spain and west Africa; thence to Indo-China), (6) The Hippotragine antelopes (from the Mediterranean region to the southern United States and Nebraska), (7) the *Procyonidæ* (from North American to South America and from southern Florida to the Mediterranean region, England and southeastern Asia), (8) the *Leporidæ* (from Texas to the Mediterranean), (9) the Tragelaphine antelopes (from the Mediterranean region to Nevada). The text is no less positive than the maps. "It is also by the Atlantic route," Professor Joleaud writes (p. 708-709), "that the genus *Hystrix* migrated into the Old World. This rodent, which originated in South America, could not have crossed by way of North America, practically no mammal of La Plata having entered that country between the Montien and the Astien. The family *Hystrioidæ* was represented in the lower Miocene, in Patagonia, by the genera *Acaremys* and *Steiromys* related to existing Argentinian types. Arboreal in the New World these animals have become burrowers in Africa, in the south of Asia and of Europe, exactly like another African rodent, *Xerus*, which originated in North America and came to France in the Tortonian. The migration of porcupines from South America to Africa and then to Europe probably took place at a geological period which was not favorable to arborescent vegetation; perhaps under the influence of a steppe climate like that of the Pontien." This passage may be taken as representative of the entire paper. I have chosen it for translation and analysis merely because it deals with a group on which I have recently been working.

That the genus *Hystrix* or the family *Hystrioidæ* originated in America there is no evidence. No American fossil has yet been found that certainly represents either the genus, the family, or a type which is directly ancestral. A few fossil teeth resembling molars of *Hystrix* are known from the Miocene of North America; but in the absence of the essential parts of the skull the systematic position of the animals represented by such fragments is impossible to determine with certainty, though at present the species are referred with little doubt to genera related to the beavers. The South American *Acaremys* and *Steiromys* were members of the families *Echimyidæ* and *Erethizontidæ* respectively. These two groups, like all the other American families of *Hystrioidæ*, are not yet known to

have ever occurred in the Old World. In each of them the tooth structure represents a peculiar and specialized type, while in the true *Hystrioidæ* the teeth are more primitive than in any other known hystricoids. Derivation of the Old World porcupines from these American rodents cannot therefore be regarded as even a remote possibility. Hence it is scarcely necessary to give special consideration to the curious idea that the arboreal South American ancestors of *Hystrix* may have become terrestrial and fossorial while traversing trans-Atlantic steppes. Among the few described fossil American squirrels there is none whose characters furnish any proof that it was ancestral to the African genus *Xerus*. Finally the assumption that the *Hystrioidæ* originated in the American Miocene is rendered unnecessary by the fact that two hystricoid genera,<sup>1</sup> *Phiomys* and *Metaphiomys*, are known from the Egyptian Oligocene. While these Egyptian animals cannot now be definitely referred to any family, and the teeth are too specialized to have given rise to the type of dental structure found in *Hystrix* and its allies, the presence of such fossils at this horizon shows that the hystricoid group is so ancient in the Old World that the supposed Tertiary migrations from South America are not required to explain its history.

Analysis of the evidence advanced in demonstration of the other migrations appears to reveal an equal degree of inconclusiveness. The history and distribution of the zalambdodont insectivores, for instance, which leads Professor Joleaud to map a route from central North America through the West Indies to West Africa, convinces Doctor Winge<sup>2</sup> that the group originated in the Old World and crossed to America by way of northern Asia. Another example: *Kalobatippus præstans* has been found in Oregon; *K. agatensis*, a "more advanced" form, has been found in Nebraska; therefore the animals migrated from the Pacific to the Mississippi. By a continuation of this reasoning the group is carried eastward to Europe and thence to China.<sup>3</sup> Similar evidence is supposed to show that early mastodons moved from Egypt westward to Florida and Nebraska.

Surmises and inaccuracies<sup>4</sup> such as those which form the substance of this paper will not deceive persons who have some knowledge of mammals living and extinct. Supported as they are, however, by the reputation of the *Revue générale des Sciences* and by the clearness and apparent authoritativeness of both the maps and the text, they are capable of spreading a wholly wrong impression among less informed readers. Mammals have not been shown to furnish the evidence needed to prove that trans-Atlantic land masses occurred in Tertiary times; neither is it clear that an explanation of their distribution is made more simple by the assumption that such land existed. The enormous blank spaces in the geological record allow, it is true, ample room for conjecture, but this is no justification

<sup>1</sup> See Miller and Gidley, Journ. Washington Acad. Sci., vol. 8, p. 445. July 19, 1918.

<sup>2</sup> Vidensk. Medd. fra Dansk naturh. Foren., vol. 68, p. 163, 1917.

<sup>3</sup> "Ainsi *Kalobatippus-Anchitherium* aurait immigré de la côte pacifique au Mississippi . . . puis en Europe par l'Atlantique central . . . enfin en Chine . . . " (p. 707).

<sup>4</sup> In summarizing the character of the Antillean fauna (pp. 712-713) the author omits all allusion to nine genera of extinct mammals described by Allen, Anthony and Miller during the years 1916 and 1917.

either for basing hypotheses on an inadequate understanding of that which is actually known or for presenting conjectures in the form of established facts.

—G. S. Miller.

**Shaw, William T.** THE COST OF A SQUIRREL AND SQUIRREL CONTROL. State College of Washington, Agr. Exp. Stat., Pop. Bull. no. 118, pp. 1-19, 11 figs. January, 1920.

Estimates of damage done to growing crops by noxious rodents are good so far as they go, but inevitably leave much to be desired. So far as known Professor Shaw is the first American author to present a quantitative study of damage done by a destructive rodent in growing grain. The rodent dealt with is the common Columbian ground squirrel (*Citellus columbianus*) of eastern Washington and neighboring states; the grain was wheat of the variety known as Hybrid 128; the location Pullman, Washington. Wheat was sown on a typical piece of ground in October, 1918. Before winter a part of the land was divided into sections 50 by 50 feet which were fenced to retain the squirrels. Immediately adjoining each squirrel plot was a check plot of similar size, slope, and soil. Photographs of the growing grain and of the amount of wheat and straw actually harvested make graphic the devastation in the squirrel-infested plots. Forty-one pounds of wheat were obtained from 500 square feet of the check plot as compared with four pounds from an equal area of the squirrel-infested plot. Similarly nine sheaves of straw were harvested from the check plot as against one sheaf from the squirrel-infested plot. The average destruction per squirrel in the experiments described was found to be 50½ pounds . . . . "which at a price of \$2.10 per bushel for hard winter wheat was worth \$1.76." The number of squirrels per acre varies but where uncontrolled may be as high as 25. If each squirrel does \$1.76 damage annually the burden on the community is seen to be enormous.

Following the description of the experiments a number of interesting facts are given regarding the life history of the species. The handsome illustrations of young in various stages of growth, of the hibernating squirrel, and of the dens admirably supplement the discussion in the text. Different means of squirrel-control, namely poison, gas, trapping and exclusion, are taken up in the final section of the paper.

Two points combine to make this paper of extraordinary value: the thorough life history studies on which it is based, and the quantitative methods used.

—Walter P. Taylor.

**B[allou], H. A.** RATS IN THE WEST INDIES. Agricultural News, Barbados, vol. 18, pp. 406, 407. December 27, 1919.

"Rats continue to do a considerable amount of damage to sugar canes in the West Indies, in spite of the activities of the mongoose. In Jamaica, it would appear that rats are pests of the first importance. A glance through the indexes of the volumes of the Journal of the Agricultural Society will reveal numerous references to rats in recent years. These relate to short articles on the damage done by rats, to brief notes by the editor, from correspondents on the importance of taking all possible action against rats, etc. There are also notes on rat traps, rat virus, and rat poisons. In one volume—that for 1908, for instance—there appear thirty-one page references to these headings.